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ABSTRACT

Trends in expenses, financial assistance, and indebtedness for students studying health professions and the effects of financial considerations on career choice were examined. The objective was to determine financial disincentives to graduates of health professions schools that affect their choice of practice specialty or their decision to practice in an underserved area. Information that is needed to determine whether there are disincentives that affect the achievement of national health goals were also identified. The influence of economic factors on career choices of minority students was considered as well. The following health professions that are eligible for the Health Education Assistance Loan and/or the Health Professions Student Loan program were covered: medicine, osteopathic medicine, dentistry, veterinary medicine, optometry, podiatry, pharmacy, and public health. Additional loan and scholarship program awards were also considered. Data are provided by profession on the current status and recent trends in educational expenses (e.g., tuition, fees); mechanisms used by students to finance their education; debt levels; and trends in federal and nonfederal financial aid. Numerous tables and five pages of references are included. (SW)

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BUREAU OF HEALTH PROFESSIONS

REPORT TO CONGRESS ON AN ANALYSIS OF FINANCIAL DISINCENTIVES TO CAREER CHOICES IN HEALTH PROFESSIONS

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HEALTH RESOURCES AND SERVICES ADMINISTRATION

REPORT TO CONGRESS ON AN ANALYSIS OF FINANCIAL DISINCENTIVES TO CAREER CHOICES IN HEALTH PROFESSIONS

November 1986

U.S. Department of Health and Human Services
Public Health Service
Health Resources and Services Administration
Bureau of Health Professions

PREFACE

This report was prepared in response to directives of Section 221 of the Health Professions Training Assistance Act of 1985, Public Law 99-129. The Act requires the Secretary of Health and Human Services to submit to the Congress a report which contains an analysis of any financial disincentive to graduates of health professions schools which affects the specialty of practice they choose or the decision to practice their profession in an area which lacks an adequate number of health care professionals. Additionally, the Act states that this report should present recommendations for legislation and administrative action to correct any disincentives which are identified and which are contrary to national health policy goals.

The report presented here describes the background and basic issues related to possible disincentives, including recent trends in tuition and overall educational costs, how health professions students finance their education, and student and graduate indebtedness. In addition, it discusses the possible implications of these trends and presents an analysis and assessment of available data and evidence on the relationship between accumulated health professions educational debts and career decisions on specialty and practice settings. The particular impact on persons from economically disadvantaged backgrounds and from racial and ethnic minority groups which are underrepresented in the health professions is also considered. Based on the assessments and analysis of the available data, recommendations are also presented as required by the law. This report focuses primarily on the relationships between indebtedness incurred in financing a health professions education and career choices. Therefore, the occupations covered include the ones that are eligible for the Health Education Assistance Loan (HEAL) program and/or the Health Professions Student Loan (HPSL) program. These include medicine (allopathic and osteopathic), dentistry, optometry, pharmacy, podiatric medicine, veterinary medicine and public health.

This report was prepared in the Health Resources and Services Administration's Bureau of Health Professions, Thomas D. Hatch, Director, by the Bureau's Division of Medicine, Dr. Daniel Masica, Director; Division of Associated and Dental Health Professions, Dr. Thomas Louden, Acting Director; Division of Student Assistance, Michael Heningburg, Director; and Division of Disadvantaged Assistance, Dr. Clay E. Simpson, Jr., Director. It was planned, compiled and coordinated by the Bureau's Office of Data Analysis and Management, Howard V. Stambler, Director.

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Report to Congress on an Analysis of Financial Disincentives to Career Choices in the Health Professions

Executive Summary

This Report to Congress on Financial Disincentives to Career Choices in the Health Professions was prepared in response to directives of Section 221 of the Health Professions Training Assistance Act of 1985, Public Law 99-129. The Act requires the Secretary of Health and Human Services to submit to the Congress a report which contains ". . . an analysis of any financial disincentive to graduates of health professions schools which affects the specialty of practice they choose or the decision to practice their profession in an area which lacks an adequate number of health care professionals." Additionally, the Act states that ". . . the report should present recommendations for legislation and administrative action to correct any disincentives which are identified and which are contrary to the achievement of national health goals."

This report prepared by the Health Resources and Services Administration's Bureau of Health Professions, describes the background and basic issues related to possible disincentives, including recent trends in tuition and overall educational costs, how health professions students finance their education, and student and graduate indebtedness. In addition, it discusses the possible implications of these trends and presents an analysis and assessment of available data and evidence on the relationship between accumulated health professions educational debts and career decisions on specialty and practice settings. The particular impact on persons from economically disadvantaged backgrounds and from racial and ethnic minority groups is also considered. Based on the assessments and analysis of the available data, recommendations are also presented as required by the law. Since the report focuses primarily on the relationship between indebtedness incurred in financing a health professions education and career choices, the occupations covered include the ones that are eligible for the Health Education Assistance Loan (HEAL) program and/or the Health Professions Student Loan (HPSL) program. These include medicine (allopathic and osteopathic), dentistry, optometry, pharmacy, podiatric medicine, veterinary medicine and public health.

Major findings of the report are:

- The educational expenses of students pursuing careers in the health professions continue to be greater than those of students in most other areas of professional training. Moreover, there have been particularly sharp increases in these expenses in recent years. For example, average medical school tuition increased 51 percent in private schools and 78 percent in public schools during the past 5 years (in current dollars).

Similarly, dental school tuition increased by about 45 percent over the past 5 years, while podiatric medicine school tuition has increased approximately 30 percent in the last 4 years.

- Increases in health profession school tuition and other expenses, coupled with constraints on the availability of low cost alternatives to financing health professions education appear to have contributed to the need for students to borrow more often in larger amounts and at higher interest rates than in the past. One study has estimated that typically three-fourths of all students in allopathic and osteopathic medicine, dentistry, optometry and veterinary medicine programs borrow between 70 and 90 percent of their professional education costs, with the typical student in most of these professions borrowing $6,000 or more annually, resulting in a sizable debt load at the time of graduation. The mean educational debt of 1985 graduates of schools of veterinary medicine, dentistry, and podiatric medicine ranged from a low of $22,252 in veterinary medicine to $49,213 in podiatric medicine.

- There is little hard empirical evidence that indebtedness has served as a disincentive to career choices of graduates in recent years, in part reflecting the relative newness of the high indebtedness phenomenon. If educational costs continue to escalate and the need to borrow larger amounts to finance education increases, it is conceivable that financial considerations may become a more prominent factor in determining career decisions than is presently discernable. However, increasing indebtedness levels are not expected to have a significant numerical impact on the overall numbers of health personnel for the remainder of this century. Projections indicate substantial future increases in the supply of health personnel until the year 2000. For example, the absolute number of physicians is projected to increase by about 50 percent by the end of this century. Nonetheless, new studies and continued monitoring in this area would be useful for more conclusively defining the relationship between educational indebtedness and career choice as well as for detecting any significant changes in the trends.

- Most studies to date do not support the contention that increases in total educational debt levels are resulting in a decrease in primary care practitioners and most have found other factors (such as student and

practitioner sociodemographic characteristics) to be more influential than indebtedness in determining career choices. However, there is evidence that the type of debt accumulated (i.e., from federally-subsidized vs. non-subsidized loan sources) may have some effect on the likelihood of choosing a primary care specialty.

- For most health professions there are few definitive studies and little evidence documenting the relationship between indebtedness and location of practice site. There is some evidence that the income earning potential of a location is important, but there is no evidence that indebtedness affects the location decision.

- There is some evidence that the early practice years of the new health professional with a relatively large educational debt may be financially difficult. A study simulating the debt burden pattern of graduates of several different health professions disciplines found that accumulated educational debt may be of such a magnitude relative to expected earnings in the initial years of practice that repayment of loans could be difficult for substantial percentages of these graduates. However, earnings of health professionals generally increase substantially as their practices mature, so that such problems should be relatively short-term.

- Increases in applications and enrollment of persons from disadvantaged and minority backgrounds were greatest during the period of readily available scholarships and low interest loans, suggesting that participation of these groups in health professions training programs may be sensitive to the availability of programs that reduce out-of-pocket student costs. However, there have been no studies that have directly addressed the possible discouragement effects of indebtedness on minority enrollment levels. Similarly, no hard evidence exists on the numbers of minority or low-income students who may have failed even to apply to health professions education programs because of the lack of low-cost financial assistance and because of their belief that they might not be able to repay the high debts. There is some anecdotal evidence from a recent series of nationwide workshops on career choices of minority students that they have been choosing alternative careers in engineering, business, and computers which require less lengthy training and are less expensive.

INTRODUCTION

Since the 1960s, the Federal Government, State Governments, professional associations, educational institutions and others have made substantial investments in programs to support the training of health professions personnel as a means of meeting national requirements and alleviating problems of inadequate access to health care and barriers to equitable access to careers in the health professions. Largely as a result of these past efforts, access to health care and health careers has become much less of a problem today than it was two decades or even one decade ago. However, with recent steady increases in the costs of obtaining a health professions education, reductions in low cost means of financing such education, and rising levels of indebtedness incurred by students in the pursuit of this education, concern has been expressed about barriers to careers in the health professions. At the same time, concern has been voiced about the negative effect that high levels of indebtedness might have on decisions to locate in underserved areas and to choose careers in primary care or other specialties in need of additional practitioners, in basic biomedical research, or in teaching.

The purpose of this report, as mandated by Section 221 of P.L. 99-129, is to compile, assess, analyze and present available information on the relationship between indebtedness levels and career choice in order to "provide an analysis of any financial disincentive to graduates of health professions schools which affects the specialty of practice chosen by such graduates or the decision of such graduates to practice their profession in an area which lacks an adequate number of health care professionals." Further, it presents recommendations for action "to correct any disincentives which are identified and which are contrary to the achievement of national health goals" or to provide the information needed to identify more definitively whether such disincentives exist.

This report is divided into six major sections.

1. Summary and Overview
2. Recommendations
3. Developments in Educational Expenses
4. Developments in Financing Education
5. Trends in Indebtedness
6. Effects of Costs, Changes in Financial Assistance and Indebtedness

The Summary and Overview section provides a summary of the more detailed sections which follow including a background discussion of student financing trends and issues, health professions graduates indebtedness and the implications and evidence of the effects of developments in these areas on career choices. The sections on Developments in Educational Expenses, Developments in Financing Education and Trends in Indebtedness present available data for each profession on the current status and recent trends in educational expenses (tuition, fees, etc.), the mechanisms used by students in each profession to finance their education, and trends in the levels of debt incurred by health

professions students in the pursuit of their education. Because the Federal government has historically played a major role in the financing of health professions education, the section on Developments in Financing Education also includes a discussion of the current status and recent trend in Federally-supported financial aid.

The last section of this report presents and assesses the evidence and possible implications from specific studies in the literature on the effects of financial factors on career choices in these professions.

The ability to fully assess the problem and to draw definitive conclusions about the implications of high levels of accumulated educational debt for the health professions has been hampered by a number of problems and limitations including the reliance on existing data sources. This report is based on data derived from a number of different sources with widely differing analytic frameworks. As a result, there are differences in the reporting and availability of data across the health professions which limit the presentations and discussions in several areas. There is a lack of comprehensive, consistent, basic trend data on the educational expenses and indebtedness of health professions students. For example, it is not possible to present empirical data which are compatible across professions on the change in tuition levels and other educational expenses over the last several years. Similarly, there is little comprehensive trend data on the sources used by health professions students to pay for their education or on reasons for the career choices made by health professions students. Further, little data exist that comprehensively describe the patterns of use of various educational financing mechanisms by health professions students. In some cases, the most recent comprehensive studies in this area present information on students enrolled in health professions schools too long ago to be relevant to today's perceived problems.

A second constraint is the lack of research studies for most health professions which explore the relationship between levels of indebtedness and career choice. At present, medicine and dentistry appear to be the only disciplines for which there have been studies attempting to quantify these relationships, but even here the information is inconclusive.

Although there is particular concern about the effects of indebtedness on the supplies of minorities underrepresented in the health professions, there are no definitive studies which quantify the relationship between debt levels or any other economic factors and career choices of minority students in most health professions.

Finally, high levels of indebtedness are a comparatively recent phenomenon whose full effects are not likely to be evident for several more years. Moreover, because of a lag in the data much of the recent reliance on high interest loans and current levels of indebtedness are not reflected in the few available studies examining the relationship between indebtedness and career choices. Therefore, the current available evidence is limited in its ability to describe the effects that continued and rising high indebtedness may have on future health professions students or on the Nation's access to care.

Despite these limitations, this report should be useful in providing a general assessment and description of the status of health professions student financing and indebtedness based on data available as of the mid 1980s. Moreover, it should be useful in pointing to the areas where additional data and continued monitoring are needed in order to substantiate or refute the hypotheses which have been made concerning the effects of these factors on career choices.

SUMMARY AND OVERVIEW

Student Financing Trends and Issues

There are substantial differences among the various health professions in the cost of an education. These result largely from variations in such factors as duration of the educational process and differences in the levels of tuition and fees and other expenses. These variations in cost notwithstanding, health professions training programs generally are among the most expensive of professional training. Moreover, such costs have increased over the years with particularly sharp increases in recent years. For example, average medical school tuition increased 51 percent in private schools and 78 percent in public schools during the past five years (in current dollars). Similarly, dental school tuition increased by about 45 percent over the past five years, while podiatric medicine school tuition has increased approximately 30 percent in the last four years.

Health professions students have traditionally used four principal ways of financing their education: loans, scholarships and grants, gifts and their own or family resources. In recent years, there have been substantial shifts in the use of these means of financing their education, and students are currently meeting the costs through more extensive borrowing. One study has estimated that typically three-fourths of all students in allopathic and osteopathic medicine, dentistry, optometry and veterinary medicine programs borrow between 70 and 90 percent of their professional education costs and the typical student in most of these professions is borrowing nearly $10,000 or more annually, resulting in a sizable debt load at the time of graduation (AMS, 1985).

To some extent, the increasing use of borrowing to finance health professions education reflects changing views of what the appropriate Federal role in providing student financial assistance should be. The Federal Government has provided substantial financial assistance to health professions students and institutions in a variety of forms since the 1960s as a means of providing access to expensive health professions training programs. However, as it became apparent in the 1970s that incentives to growth in the overall number of health professions trainees were no longer necessary, Federal financial support to training institutions was reduced thereby generating a need for schools to replace these subsidies with funds from other sources including higher tuitions. Further, based on budgetary constraints and the view that health professions students should assume a greater portion of the cost of their education, a large part of the current Federal funds specifically provided for financial assistance to health professions is allocated to unsubsidized loans. The Health Education Assistance Loan (HEAL) (a guaranteed loan), is now the major non-subsidized loan available to health professions students. Although its original intent was to serve as a loan of last resort, student reliance upon HEAL loans as a financing mechanism has expanded rapidly in the last few years. Approximately 20 percent of enrolled health professions students had HEAL loans in 1985 compared with about 8 percent as recently as 1982.

By 1986, nearly one billion dollars in HEAL loans had been made since its inception in 1979. Across the individual health professions, the substantial increase in reliance on unsubsidized loans is striking. For example, HEAL loans accounted for approximately one percent of all financial assistance awarded to medical students in 1979-1980; just 4 years later in 1983-1984, nearly 20 percent of financial aid awarded was in the form of such loans. Similarly, the percentage of dental students using HEAL loans increased from 6 percent in 1979 to 26 percent in 1984, and HEAL loans accounted for more than half of all financial assistance to podiatric medicine students in academic year 1984-1985.

In contrast to the direction the HEAL loan program has taken, the number of Exceptional Financial Need Scholarships awarded declined by about 50 percent from Fiscal Year 1980 to Fiscal Year 1985 and the number of first time recipients of NHSC scholarships declined about 98 percent over this period.

Thus, increases in health profession school tuition and other expenses, coupled with constraints on the availability of low cost alternatives to financing their education appear to have contributed to the need for students to borrow more often in larger amounts and at higher interest rates than in the past, resulting in a significant rise in overall indebtedness. As an example, over the relatively short four-year period from 1980 to 1984, there has been a more than 50 percent increase in the mean educational debts of senior medical students (from $17,200 to almost $27,000). The mean educational debt of 1985 graduates of schools of veterinary medicine, dentistry, and podiatric medicine ranged from a low of $22,252 in veterinary medicine to $49,213 in podiatric medicine.

With the increase in borrowing as a primary means of financing health professions education, a number of student financing issues have arisen relating to the impact of high indebtedness. They include: assessment of the ability of health professions graduates to repay the debts incurred, the expanded need for improved debt management on the part of lenders and insurers, and financial counseling of health professions students. While these issues at present appear to be only indirectly related or not clearly identified as to their impact on the issue of career choice, it is clear that the interrelationship of these issues needs to be examined carefully. And, as long as borrowing remains an important means of accessing a career in the health professions, debt management issues will likely continue to be a large part of the total picture of student financing trends and issues.

Implications of Health Professions Graduate Indebtedness for Career Choices

It has been postulated by some observers that high and rising levels of accumulated educational debt restrict health professionals' ability to make career choices. Some believe that such restrictions may have a negative influence on national health policy goals of promoting equitable access to careers in the health professions, increasing the supplies of minorities who are underrepresented in the health professions, and increasing the Nation's access to primary care and to health care providers in rural and underserved areas. It has been argued that all but those persons with substantial available financial resources would be discouraged from pursuing a career in the health professions. It has also been suggested that those graduates with heavy indebtedness would be more inclined to locate in metropolitan areas where professional incomes are generally higher and where supplies of health professionals are usually ample; and, that they would choose to practice in the most lucrative, non-primary care specialties which are less in need of additional practitioners. Some observers have also suggested that students who use high interest loans to finance their education may face large repayments for a substantial number of years of their careers and may pass the costs of their indebtedness on to their patients (Sandson, 1983). Furthermore, the relatively low salaries of public health personnel, researchers and faculty coupled with increasing educational debt is also thought by many to be a possible deterrent to practice in these fields. These arguments are largely based on researcher assumptions about the expected relationship between economic factors and the career choices made by those in the health professions rather than on the findings of specific studies of these relationships.

Available evidence on the effects of indebtedness on career choices is, unfortunately, largely circumstantial and inconclusive with no clear cause and effect readily identifiable. Declines in the pool of applicants to health professions schools in recent years suggest that educational costs and the consequent indebtedness may be factors, but there is no definitive evidence that such is or is not the case. There is some evidence in several disciplines that applicants from low income families are becoming a smaller percentage of the total applicant pool. Again, however, there are no conclusive studies or hard evidence on the relationship of increasing indebtedness to this occurrence.

Determining influences on choice of a practice location is very complex and a number of studies have been done to assess the importance of various factors in location decisions. There is evidence that the income earning potential of a location is important. However, there are few definitive studies and little evidence documenting the relationship between indebtedness and location of practice site. A study of 1980 dental graduates found that those with the highest debt levels tended to choose small towns and semirural areas as their planned practice location (Graham, 1981). Analyses of indebtedness and career plans among 1983 medical school graduates found that high indebtedness was associated with a preference for an urban or suburban practice location and that students

who indicated they were willing to serve in an economically deprived area had lower average debts than others. However, this finding was attributed to the preferences of underrepresented minority students who were more likely to indicate a willingness to serve in these areas and who also had relatively lower average indebtedness (AAMC, 1985).

Most studies to date do not support the contention that increased educational debt is resulting in a decrease in primary care practitioners and most have found that other factors (such as sex, marital status and type of institution attended) are more influential than indebtedness on career plans. However, a study based on 1983 data for resident physicians examined the relationship between indebtedness and physician specialty choice by differentiating among the various types of debt and found that an increase in the amount of debt from federally-subsidized loans (GSL, NDSL and HPSL) had no effect on the specialty choice of whites but slightly increased the probability of non-whites selecting a primary care specialty. On the other hand, increases in debt from nonsubsidized HEAL loans were found to reduce the likelihood of a physician choosing a primary care specialty, regardless of race. Although these analyses did show that the type of debt accumulated had some effect on specialty choice, the influence was small. For example, a $10,000 increase in HEAL debt decreased the probability of selection of a primary care specialty (by 7.5 percentage points), and a $10,000 increase in subsidized debt increased the probability of non-whites selecting primary care by 5.3 percentage points.

The influence of increasing costs and indebtedness levels on the career choices of low-income students and minorities who are underrepresented in the health professions has been of particular concern to some observers. It has been stated that the growing financial burden of students may contribute to the continuing underrepresentation of some minority health professionals and would in turn have a negative impact on efforts to alleviate the unmet health care needs of minorities and persons living in underserved and less-well-served areas.

Increases in applications and enrollment of persons from disadvantaged and minority backgrounds were greatest during the period of readily available scholarships and low interest loans, suggesting that participation of these groups in health professions training programs may be sensitive to the availability of programs that reduce out-of-pocket student costs. However, there have been no studies that have directly addressed the possible discouragement effects of indebtedness on minority enrollment levels. Similarly, no hard evidence exists on the numbers of minority or low-income students who may have failed even to apply to health professions education programs because of the lack of low-cost financial assistance and because of their belief that they might not be able to repay the high debts. There is some anecdotal evidence from a recent series of nationwide workshops on career choices of minority students that they have been choosing alternative careers in engineering, business, and computers which are both less lengthy and less expensive. The current and future magnitude of such trends, if existent, and the effects on minority representation in the health fields are unknown.

Another recent occurrence in health professions graduate career choices, which is thought to be associated with high indebtedness levels but does not appear to affect national health policy goals, is the increase in the proportion of new graduates joining group practices and/or taking salaried positions rather than starting a new solo practice with its commensurate high start-up costs. However, in addition to possibly reflecting an increasing availability of such positions, some of these developments may simply reflect the selection of such practices by new graduates to be followed later by the selection of independent practice.

In summary, the relatively high and increasing levels of indebtedness carried by health professions graduates into practice has caused concern about the effects on both the career choices of these graduates and the ability of graduates to repay the debts incurred. Yet, there is a lack of hard empirical evidence that indebtedness has served as a disincentive to career choices of graduates in recent years, in part probably reflecting the relative newness of the high indebtedness phenomenon as well as the small magnitude of the effects found . If educational costs continue to escalate and the need to borrow larger amounts to finance education increases, it is conceivable that financial considerations may become a more prominent factor in determining career decisions than may be presently discernable. However, increasing indebtedness levels are not expected to have any significant impact on overall health personnel supply levels for the remainder of this century. Projections indicate substantial future increases in the supply of health personnel until the year 2000. The absolute number of primary care physicians (a group of particular concern) is projected to increase by over 50 percent by the end of this century. Nonetheless, new studies and continued monitoring in this area would be useful for more conclusively defining the relationship between educational indebtedness and career choice as well as for detecting any significant changes in the trends.

RECOMMENDATIONS

Present data do not indicate a need for substantial policy changes or research efforts which are substantially different from those which are currently in place or planned. However, some changes may be needed in the future depending on whether or not trends change sharply.

Based upon the nature of the results of this analysis, it is clear that further research would be useful to define empirically any relationship between health professions educational indebtedness and career choice. Present levels of public and private research effort are sufficient to detect any sharp changes and should be maintained.

There does not appear to be a need for a major expansion in the number of such studies at this time but subjects for future research might include efforts:

- To document the degree to which financial considerations including both foregone and expected earnings, deter or encourage applicants to health professions training programs.

- To determine the degree to which financial needs affect attrition from these programs.

- To document the relationship between expected financial remuneration and choice of specialty, practice setting and geographic area. These studies should especially consider the evidence on economically disadvantaged and underrepresented minority groups.

- To determine the patterns of use of various educational financing mechanisms by disadvantaged and underrepresented minority students and the potential impact of changes in these mechanisms on educational decisions by these groups.

- To track recent health professions graduates' income histories during the early stages of their careers through periodic surveys. These surveys could examine those factors that affect the proportion of income that new professionals have or will have available for debt repayment.

Regardless of long-term trends, present levels of indebtedness often pose a financial hardship for professionals holding residencies or other relatively low-paying or entry jobs. Therefore, strong consideration should be given to relieving the potential hardship of high levels of debt repayment during the early career years through policies which:

- Provide greater flexibility for repayment of loans during residency training and early practice years by expanding loan consolidation programs and graduated repayment option programs.

Other recommendations involve Federal government encouragement of efforts in the non-Federal sector:

- To encourage expansion of State and local programs designed to provide loan forgiveness programs for low-income students who will serve in medically underserved areas.

- To encourage the institutionalization of programs of financial planning and debt management counseling.

DEVELOPMENTS IN EDUCATIONAL EXPENSES

To at least some extent, steadily rising costs and declines in subsidies have caused health professions schools, private ones in particular, to make increases in tuition in recent years. For example, over 1980-1985 period the vast majority of medical schools and dental schools increased their first-year tuition by more than 50 percent (current dollars); 32 percent of medical schools and 22 percent of dental schools more than doubled their tuition in that five-year period (Table 1).

During the past five years average tuition increased, in current dollars, 51 percent for private and 78 percent for public medical school students. In the Fall of 1985 the average tuition for State resident first-year medical students at public schools was $3,890, an increase of 345 percent, in current dollars, over a ten-year period. With other expenses (fees, transportation, room and board, books), the expense for a first-year student who was a State resident in 1985 was $11,621 (Table 2).

Tuition for non-State residents averaged $8,557 for the 1985-86 academic year. Including other expenses averaging $7,731, a first-year nonresident student attending a public medical school incurred a total expense of $16,688. The average first-year costs for private medical school students in 1985-86, including tuition, fees and other expenses, was $23,306 (AAMC, 1986).

Osteopathic students' educational expenses have also continued to increase in both public and private schools. Between 1982 and 1984, first-year average tuition levels in private schools increased 17 percent, from $10,389 to $12,225, while public school tuition increased from $2,727 to $2,872 for State residents and to $4,115 for students from other States. Average total educational expenses for first-year students attending private osteopathic schools in 1983-84 increased 2.7 percent from the previous year to $19,200. Total costs rose more steeply in public osteopathic colleges, by 13 percent over 1982-83. For State residents attending public osteopathic colleges in 1983-84, average education expenses were $10,400 while non-State residents attending public osteopathic schools, incurred total educational expenses of $12,300, about one-third less than the average first-year costs of students attending private osteopathic schools (AACOM, 1986).

A 1981 study conducted for the Department of Health and Human Services indicated that the "average" medical student at that time could afford $35,000 a year for tuition and fees before the level of debt owed for a medical education makes medicine an unsatisfactory career choice. The figure was lower for those who planned to practice in a low-paying specialty such as psychiatry (Urban Institute, 1981).

The average tuition for first-year dental students in academic year 1985-86 was $7,085 for residents and $9,703 for nonresidents (American Dental Association, January 1986). By way of contrast, in 1981-82 the average tuition was $4,742 for residents and $6,721 for nonresidents (American Dental Association, 1981). When adjusted for inflation, resident and nonresident tuitions increased by 26 percent and 22 percent

Table 1 - Distribution of Medical and Dental School First-Year Tuition Increases, 1980-81 to 1985-86

Percent Increase 1980-1985	Number and Percent of Schools			
	Medical		Dental	
0.0 - 24.9	0	(0.0)	0	(0.0)
25.0 - 49.4	14	(11.2)	6	(10.4)
50.0 - 99.9	71	(56.8)	39	(67.2)
100.0 +	40	(32.0)	13	(22.4)
	125	(100.0)	58	(100.0)

Sources: Association of American Medical Colleges, Medical School Admission Requirements, 1982-83 and 1987-88

American Dental Association, Supplement 11 to the Annual Report 85/86 Dental Education

Notes: The Uniformed Services University of the Health Sciences has no tuition and Mercer University School of Medicine admitted its first class in 1982.

Emory and Oral Roberts Universities are discontinuing their dental education programs and are no longer accepting entering classes. There were no first-year classes in 1985-86

Table 2 - Average Tuition, Fees and Other Expenses for First-Year Medical Students, 1985-1986

	Average
Public Medical Schools, Residents	
Tuition	$ 3,890
Student Fees	389
All Other Expenses	7,342
Average Costs	$11,621
Public Medical Schools, Nonresidents	
Tuition	$ 8,557
Student Fees	389
All Other Expenses	7,342
Average Costs	$16,688
Private Medical Schools	
Tuition	$13,678
Student Fees	414
All Other Expenses	8,214
Average Costs	$23,306

Source: Association of American Medical Colleges, Division of Student Programs, April 1986

respectively between 1981-82 and 1985-86. In unadjusted current dollars total dental school educational costs for residents rose from $27,000 in 1981-82 to $37,000 in 1985-86. The same costs for nonresidents were $34,000 in 1981-82 and $48,000 in 1985-86. There is considerable variation in costs by type of school attended. In 1985-86 resident students attending public dental schools averaged $23,000 in total dental education costs; those in private State-related dental schools $52,000; and those in private dental schools $63,000 (American Dental Association, January 1986).

Optometric students' overall educational expenses, including tuition, fees, textbooks, instruments, room and board, and miscellaneous educational costs (but not total living expenses), rose from $4,000 in 1977-78 to $6,810 in 1981-82 (a 70 percent increase) for resident students and from $5,400 in 1977-78 to $8,862 (62 percent) for nonresidents of public institutions (ASCO, September 1984). At independent schools of optometry, these costs increased to $11,254 (up 73 percent) for residents and to $11,921 (up 67 percent) for nonresident students.

Tuition for optometric students increased an average of 52 percent for resident students and 64 percent for nonresident students at public schools. During the same period, students at the independent colleges experienced average tuition increases of 87 percent for residents and 73 percent for nonresidents. Room and board costs also increased, an average of 74 percent at public institutions and 53 percent at independent schools. Such increases are above the rate of inflation during this period.

There are seven active colleges of podiatric medicine currently in operation, two of which were started in the last five years. All of the colleges are private institutions and all except the two newest colleges are independently operated. The absence of significant State funding has led the colleges to rely on tuition income for about 70 percent of their total budgets. In 1985-86, the tuition rates at the seven colleges ranged from $10,500 to $11,800 per year as compared to $7,500 to $8,900 in 1982-83, an increase of approximately 30 percent (in adjusted dollars) in the last four years (AACPM, 1986). Specific data on other costs associated with podiatric education are not available, but are likely relatively high since the colleges, with one exception, are located in major metropolitan areas.

DEVELOPMENTS IN FINANCING EDUCATION

Overview of Federally Supported Student Financial Assistance

A substantial portion of the financial assistance available to students pursuing careers in the health professions continues to be provided directly or indirectly by the Federal Government. Recent trends in State and other sources of support are not currently available in a comprehensive form across health professions. However, where it is available such information is presented in the occupation specific sections on financing which are presented later in this report.

The Federal Government's interest in the financing of health professions education derives largely from its goal of assuring adequate access to health services. As such, perceptions of manpower shortages in the 1950s spurred legislation enacted in the 1960s which emphasized the training of larger numbers of health personnel particularly by providing financial support to health professions training institutions in the form of construction funds, start-up assistance and capitation incentives for increasing class size. This legislation also stressed access of all population groups to a health professions education through scholarships, low-cost subsidized loan availability, and programs which were targeted at providing support for minorities.

Beginning in the mid 1970s Federal financial support to health professions training institutions in the form of capitation and construction grants was gradually reduced. It was felt that the increased numbers of health professions graduates resulting from previous efforts were alleviating the perceived overall shortages of health personnel. Instead emphasis shifted to improving the geographic and specialty distributions of health professionals. The phase out of the Health Professions Scholarship Program and the concomitant increases in funding for the National Health Service Corps Scholarship program (which has a service obligation aimed at improving the distribution of health professionals) in part reflect that emphasis.

In more recent years, with apparent improvements in the distribution of health personnel and more and more budgetary constraints, Federal financial aid efforts have increasingly incorporated the view that health professions students should assume a larger part of the cost of their professional education. Thus, while subsidized low-cost loan programs continue to be available, the HPSL revolving loan program which is targeted to health professions students with exceptional financial need has not received new Federal capital contributions since FY 1983. New loans from this program are made from funds provided by the repayment of old loans. On the other hand, a substantial part of the funds under Federal programs currently provided for health professions student financial assistance are allocated to unsubsidized loans.

The discussion which follows presents the federally-supported student financial assistance programs which are currently available to health professions students and describes recent changes which have occurred in these programs.

Health professions students have access to Federal sources of financial aid designated especially for health professions training and to Federal sources available to all undergraduate and graduate students. Those programs exclusively intended for health professions students include the Health Professions Student Loans (HPSL), Health Education Assistance Loans (HEAL) and Exceptional Financial Need First Year Scholarships (EFN) and a new program of scholarships for disadvantaged students with exceptional financial need (FADHPS). The National Health Service Corps Scholarships (NHSC) and the Armed Forces Health Professions Scholarships (AFHPS) have also been used as resources in support of health professions education although they are intended primarily as means of alleviating health manpower shortages in underserved areas and in the military rather than to provide general financial assistance.

Those Federal sources of financial aid which are available to all graduate students, including health professions students, include the Guaranteed Student Loans (GSL), National Direct Student Loans (NDSL) and the Auxiliary Loan for Assisting Students/Parent Loan to Undergraduate or Graduate Students (ALAS/PLUS). It is not possible to distinguish health professions students from all other borrowers in the data reported from these sources.

The provisions of the federally-supported loan programs are summarized in Table 3. With the exception of the HEAL and ALAS/PLUS programs, all of the programs are subsidized by the Federal Government. The HEAL, GSL, and ALAS/PLUS carry a Federal guarantee of repayment. Additionally, in all programs except the HEAL and ALAS/PLUS programs, students must demonstrate that they are in need of financial assistance in order to pursue their courses of study.

The data shown in Tables 4 and 5 illustrate the recent growth in federally-supported financial assistance in the form of unsubsidized loans as well as the status of other sources. The number of EFN scholarships awarded declined from 813 in FY 1980 to 421 in FY 1985 and the amount awarded dropped from about $10 million to approximately $7 million over this period. Declines in the number of scholarships reflect mandated increases in the scholarship amounts as well as the decline in funds available. A large part of the decline noted in Federal scholarships awarded over this period reflects the phasing down of the National Health Service Corps Scholarship program which as previously mentioned was not intended as a general source of student financial assistance. The number of first-time recipients of these scholarships declined from 1,605 in FY 1980 to 37 in FY 1985. Similarly, the number of borrowers receiving support from the subsidized HPSL program declined by 3,147 from FY 1982 to FY 1985, while the total amount borrowed over this period declined from $50 million to $44 million. As previously mentioned, Federal capital contributions have not been made for this program since 1983 and current lending levels are limited to the amounts students repay to schools' revolving funds. Approximately $49 million has been available each year from repayment of earlier loans.

In contrast to the direction that the HPSL and other resources used to finance health professions education has taken, in general there has been an increase in the use of loans as a means of financing professional

Table 3 - Federal Student Loan Programs Available to Health Professions Students

	Health Education Assistance Loans (HEAL)	Health Professions Student Loan (HPSL) Program	Guaranteed Student Loan (GSL) Program	National Direct Student Loan (NDSL) Program	ALAS/PLUS
Administered by	DHHS, HRSA	DHHS, HRSA	Department of Education	Department of Education	Department of Education
Lender	Eligible banks, schools, agencies, etc., using private capital.	Eligible health professions schools, using Federal and school funds (9/1 ratio) in revolving fund.	Eligible banks, schools, etc., State agencies and designated non-profit agencies using private capital.	Eligible schools using Federal and school funds (9/1 ratio) in revolving fund.	Eligible banks, schools, etc., State agencies and designated non-profit agencies using private capital.
Loan Limits	$20,000 per year, $80,000 aggregate, to be used solely for tuition and reasonable educational expenses.	Tuition plus $2,500 per year. No aggregate limit. Medical students graduating after June 30, 1979, must exhibit "exceptional financial need."	For graduate/professional $5,000 annual, $25,000 aggregate including amount borrowed as undergraduate; needs test determines limits for families $30,000 income.	$12,000 aggregate limit for higher education both graduate and undergraduate.	$3,000 per year not more than $15,000 cumulatively.
Interest Rate	Unsubsidized interest at variable rates not to exceed the average bond equivalent rate during the prior calendar quarter for 91-day Treasury Bills sold at auction plus 3%; interest accrues during health professions school and residency.	9% beginning 12 months after completion of training.	7% for students who currently have 7% GSLs; 9% for new loans. Begins 6-12 months after graduation for subsidized loans, immediately for non-qualified students.	5% beginning 6 months after graduation.	12% annually payable by the borrower within 60 days of the day the loan is made.
Repayment Requirements	10-25 years, beginning 9-12 months after completion of training. Additional deferment for up to 3 years for Armed Forces, Peace Corps, VISTA, NHSC, or for full-time study at an eligible school.	10 years, beginning 12 months after leaving school. Deferment up to 3 years for Armed Forces, Peace Corps, NHSC, Public Health Service, and until completion of further advanced professional training, including internship and residency.	10-year limit from beginning of repayment (9-12 mos.) after leaving school for 7% GSLs, 6 mos. for others). Up to 3 years deferment for Armed Forces, Public Health Service Commissioned Corps; Peace Corps, etc.	10-year limit beginning 6 months after leaving school. Deferment up to 3 years for Armed Forces Peace Corps, further 1/2 time enrollment, 2 years for internship or residency.	Student borrowers may qualify for a deferment of repayment of principal if they are enrolled full time. Payment of interest is due during any deferment period.

SOURCE: Division of Student Assistance, Bureau of Health Professions, Health Resources and Services Administration

Table 4 - Trends in Dollar Volume Borrowed and Awarded in Federally-Supported Student Loan and Scholarship Programs, FY 1980-1985

Program	DOLLAR VOLUME (MILLIONS) FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985
SIMPLE INTEREST, SUBSIDIZED LOANS						
GSL	4,336	7,367	5,901	6,537	7,506	8,376
NDSL*	694	580	597	682	763	879
HPSL	no data	no data	50	55	49	44
MARKET RATE, NON-SUBSIDIZED LOANS						
ALAS/PLUS	0	30	103	257	369	512
HEAL (Total)	25	36	93	162	237	285
EXCEPTIONAL FINANCIAL NEED SCHOLARSHIP	10	10	5	6	6	7

* Dollars Advanced

SOURCE: Bureau of Health Professions and Department of Education. As reported in A Review and Assessment of the Health Education Assistance Loan Program and of Considerations Relevant to HEAL Policy Formulation prepared for the Health Resources and Services Administration, Department of Health and Human Services by F. French and Associates, March 1986

Table 5 - Trends in Numbers of Borrowers and Scholarship Recipients in Federally-Supported Student Assistance Programs, FY 1980-1985

Program	Numbers of Borrowers Each Fiscal Year					
	1980	1981	1982	1983	1984	1985
SIMPLE INTEREST, SUBSIDIZED LOANS						
GSL	2,078,000	3,340,000	2,646,000	2,885,000	3,247,000	3,660,000
NDSL	813,372	684,067	674,901	718,588	867,000*	999,000*
HPSL	no data	no data	23,436	24,787**	22,851**	20,289
SCHOLARSHIPS						
EFN	813	725	301	361	348	421
NHSC - 1st-Time	1,605	162	160	144	69	37
DOD - 1st-Time	1,425	1,438	956	1,167	1,002	911
MARKET RATE, NON-SUBSIDIZED LOANS						
ALAS/PLUS	0	11,000	42,000	100,000	140,000	192,000*
HEAL - 1st-Time	2,314	3,589	8,245	12,134	13,304	13,420
HEAL - Total	2,632	4,196	10,500	18,122	24,960	28,727

*Estimate
**Corrected figures

SOURCE: Bureau of Health Professions and Department of Education. As reported in A Review and Assessment of the Health Education Assistance Loan Program and of Considerations Relevant to HEAL Policy Formulation prepared for the Health Resources and Services Administration, Department of Health and Human Services by F. French and Associates, March 1986, HPSL figures for 1983 and 1984 corrected per later data on pp. 52-53 of the French report

education. The HEAL program in particular has grown phenomenally since its inception in 1979. In its first 3 years of operation there were 7,891 borrowers with $69.2 million guaranteed. In Fiscal Year 1985 there were 28,727 borrowers with $284.7 million in loans guaranteed. Variations in the cumulative numbers and amount of loans disbursed for individual disciplines are illustrated in Table 6. By the end of FY 1986, over one billion dollars in loans will have been guaranteed.

With the increasing reliance on loans as a principal means of financial assistance for health professions students has come increasing concern and attention on issues associated with high levels of indebtedness. While this report focuses on the issue of the effects of high indebtedness levels on career choices of health professions graduates there are other issues and concerns related to increasing indebtedness levels which are the subject of a number of recent studies. These issues include the assessment of the abilities of health professions graduates to repay the debts incurred and the expanded need for improvement in debt management on the part of lenders as well as insurers, and financial counseling of health professions students. A number of studies which have a bearing on such issues have been identified and are listed as references at the end of this report. However, the interrelationship among the various issues related to high levels of student indebtedness are not clear at the present time and need to be examined carefully.

Table 6 - Loans Disbursed (Principal Only) to HEAL Borrowers from the Inception of the HEAL Program to September 30, 1985, by Discipline

Discipline	Borrowers		Principal Disbursed	
	Number	Percent	Amount	Percent
Medicine	24,007	44.1	$353,530,451	41.8
Osteopathic Medicine	5,139	9.4	117,258,775	13.9
Dentistry	9,480	17.4	154,710,380	18.3
Veterinary Medicine	675	1.2	6,392,708	.8
Optometry	1,578	2.9	14,972,676	1.8
Podiatry	3,088	5.7	64,405,050	7.6
Pharmacy	861	1.6	5,986,935	.7
Public Health	260	.5	2,007,867	.2
TOTALS[1/]	54,455	100.0	$845,015,883	100.0

SOURCE: Bureau of Health Professions and Department of Education. As reported in A Review and Assessment of the Health Education Assistance Loan Program and of Considerations Relevant to HEAL Policy Formulation prepared for the Health Resources and Services Administration, Department of Health and Human Services by F. French and Associates, March 1986. (Note: Percents do not add to 100 due to rounding methods.)

1/ Includes chiropractic, clinical psychology, and health administration

Profession Specific Education Financing Developments

Medicine

As the cost of obtaining a medical education has increased, the total amount of financial assistance awarded to medical students has also increased. However, fewer students are currently receiving assistance and the sources and forms of this assistance are changing. In 1984-85, 68 percent of the 67,090 students enrolled in medical school received financial assistance, through 118,430 loan, scholarship and work study awards totaling $506 million as compared with 78 percent of the 66,485 enrolled students in 1981-82 who received 117,600 awards totaling $465 million.

Although the number of awards and total dollars awarded for financial assistance from non-Federal sources have increased, the Federal Government remains the principal source of financial assistance for medical students. Financial assistance to medical students from Federal loan and scholarship programs has accounted for approximately 80 percent of total student assistance funds over the past five years. However, the form of this assistance continues to change. Federal dollars for scholarship awards declined from more than 68 percent to 55 percent of available scholarship assistance, dollars for loans under Federal programs stabilized at slightly more than 90 percent of all loan funds available for student assistance between 1980-81 and 1984-85 (see Tables 7 and 8).

During this five-year period medical students received about the same number of scholarships overall although the total funds for these scholarships declined about 10 percent. The number of scholarships awarded from non-Federal sources increased by 3,882 while the number from Federal sources declined by 3,886. On the other hand, the number of loans awarded from both Federal and non-Federal sources increased by more than one-fourth over this period.

Approximately 62 percent of non-Federal financial assistance in 1984-85 was provided in the form of scholarships and about 38 percent in loans. In contrast, dollars awarded for loans under Federal programs outnumbered those awarded for scholarships by more than five to one. Most of the overall decline in Federal scholarship assistance can be attributed to reductions in the National Health Service Corps (NHSC) Scholarship program. Although this program has been used as a resource in financing medical education, it was designed to obtain the services of trained health professionals in certain areas of critical need and was not intended as a student financial assistance program. Between 1980-81 and 1984-85, the average NHSC scholarship award increased from $12,300 to $16,100, while total funds available through this program decreased from $50 million to $4 million and the number of students receiving these service-related scholarships declined from 4,079 to 246 recipients. Part of the decline in NHSC service-related support has been offset by the increase in smaller, non-Federal scholarships which usually award less than $2,500 a year for support.

Table 7 - Distribution of Federal Financial Assistance for Medical Students by Source, Amount and Number of Awards, 1980-81 and 1984-85

Source	1980-1981 Amount (Millions)	1980-1981 Number of Awards	1984-1985 Amount (Millions)	1984-1985 Number Awards
Scholarships				
Exceptional Financial Need[1/]	5.1	441	2.4	147
Medical Scientist Training Program	---	---	8.6	586
Armed Forces Health Profession	38.0	3,425	52.2	3,080
National Health Service Corps	50.1	4,079	4.0	246
Total	$93.2	7,945	$67.2	4,059
Loans				
Health Professions Student Loans[1/]	22.7	9,208	19.0	7,647
Guaranteed Student Loans	189.3	41,633	190.0	40,000
Health Education Assistance Loans[1/]	15.3	2,121	91.7	10,764
National Direct Student Loans	16.0	7,933	18.5	9,259
ALAS/PLUS*	---	---	27.2	9,491
Total	$243.3	60,895	$346.4	77,161
Work Study	1.4	1,206	2.2	1,498

1/ These figures differ from those reported by the Bureau of Health Professions probably as result of incomplete reporting of medical schools

*Auxillary Loans to Assist Students or Parental Loans to Undergraduate Students

SOURCE: Journal of the American Medical Association. "83rd Annual Report on Medical Education in the United States." September 1983 and Unpublished AAMC Data, June 1986

Table 8 - Distribution of Non-Federal Medical Student Financial Assistance by Source, Amount and Number of Awards, 1980-81 and 1984-85

Source	1980-1981 Amount (Millions)	1980-1981 Number of Awards	1984-1985 Amount (Millions)	1984-1985 Number of Awards
Scholarships				
National Medical Fellowships	0.7	631	.8	697
Other Service Commitment	11.2	2,628	11.0	6,849
Medical Schools	23.1	11,459	35.0	13,583
All Other Sources	8.2	5,287	9.1	2,758
Total	$ 43.2	20,005	$ 55.9	23,887
Loans				
American Medical Association	0.02	12	---	---
United Student Aid Loans	1.4	361	---	---
Medical Schools	9.3	5,952	26.8	9,757
Other Sources	10.1	3,536	6.8	2,811
Total	20.7	9,861	33.6	12,568
Work Study	---	---	0.6	470

Source: Journal of the American Medical Association. "83rd Annual Report on Medical Education in the United States." September 1983 and Unpublished AAMC Data, June 1986

Another Federal service-obligation scholarship program, the Armed Forces Health Professions (AFHP) program has increased the amount of scholarship funds awarded to medical students from $38 to $52 million over the past five years. Although the number of recipients has remained fairly stable, the average award increased 50 percent in current dollars between 1980 and 1984, from $11,103 to $17,000 (JAMA, 1982 and 1985).

Non-Federal scholarships are provided by National Medical Fellowships, Inc., State governments and State medical societies, medical schools, philanthropic and other private organizations. These sources provided almost 32 percent of all scholarship assistance in 1980-81 with awards totaling $43 million dollars. In the 1984-85 academic year, these sources provided 45 percent of scholarship aid totaling $56 million (Table 8).

Financial assistance from loans increased in current dollars from 66 to 77 percent of total assistance awarded to medical students between 1980-81 and 1984-85. Federally guaranteed loans were the major providers of this increase, although private and State funds for loans increased substantially during this period.

Funds awarded to medical students from the federally-subsidized Health Professions Student Loans (HPSL) decreased slightly from $23 million in 1980-81 to $19 million in 1984-85 while the number of loans awarded decreased from 9,210 to 7,650[1/] These loans are limited to medical students who demonstrate exceptional financial need and the average award in 1984-85 was small, about $2,500.

Guaranteed student loan funds awarded to medical students increased moderately between 1980-81 and 1984-85 to $190 million. Beginning in the Fall of 1981, students were required to prove eligibility for financial assistance if family income was over $30,000. The number of loans has edged down since then, from 41,600 to 40,000. The interest rates on these loans vary from 7 percent to 9 percent and medical students do not pay interest on them until after graduation; repayment may be deferred for residency training for up to 2 years. The average amount of these loans was about $4,500 in 1984-85 (JAMA, 1983 and 1985).

The Health Education Assistance Loan (HEAL) program is the major non-subsidized Federal loan available to medical students. Borrowers must pay an insurance premium charge and interest at or near commercial loan rates and the amounts borrowed are accrued and compounded during medical school and residency training or other deferment periods. Because of the

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1/ These figures as reported by AAMC may differ somewhat from figures reported by the Bureau of Health Professions for several reasons including an incomplete number of schools reporting to the AAMC. The intent of this section is to present a profile of student financial assistance according to the sources. Therefore, AAMC figures are used since BHPr data do not show assistance derived from non-Federal sources.

high rate of interest these loans carry and the implications of high repayments which some students may be unaware of or not be able to manage, there is concern about their rapid growth.

According to information from the AAMC, between academic years 1980-81 and 1984-85, the amount of HEAL loans obligated to medical students increased from $15 to $92 million while the number of students obtaining these loans grew from 2,100 to 10,800.

As previously mentioned, there has also been substantial growth in non-Federal loans from school funds, some State governments, philanthropic foundations and other private organizations. In 1980-81, such sources provided 11,000 loans totaling $22 million in financial assistance. By 1985, the amount of funds from these sources had grown to $61 million and more than 22,600 non-Federal awards were made.

Some observers believe that as tuition and fees continue to increase, the available methods of financing a medical education may again become a critical variable in determining career choice (Hall and Whybrow, 1984). One study has indicated that some of the Nation's more expensive schools have already included the ability to pay as an admission criterion and points to the possibility that more schools will place greater emphasis on future students' ability to finance their medical education as part of the selection process (Shea and Fullilove, 1983). However, this occurrence could be balanced by other schools that have not and will not include the ability to pay as admission criteria.

Data from 1979-80 through 1983-84 show that in osteopathic medicine as in allopathic medicine, scholarships diminished as a source of financial assistance and more osteopathic students obtained loans to finance their education. The number of scholarships awarded decreased from 1,532 for 12 schools reporting in 1979-80 to 1,279 for 14 reporting schools in 1983-84, while the number of loans more than doubled, from 5,162 to 10,730. Scholarship assistance awarded to osteopathic students represented 23 percent of total assistance awarded in 1979-80 and decreased by more than one-half to 11 percent of 1983-84 assistance.

About three out of four scholarships awarded to osteopathic students in 1979-80 were made through the National Health Service Corps (NHSC) or the Armed Forced Health Professions Scholarships (AFHPS) programs; only 46 percent of the 1983-84 awards were from these sources. Most of the change can be attributed to reductions in the NHSC program, which declined from 33 percent to 8 percent of available scholarship assistance during this period. Although the number of AFHPS decreased slightly, these scholarships accounted for 38 percent of all scholarships awarded and provided 67 percent of 1983-84 scholarship funds.

While the total number of Federal awards (AFHP and NHSC) decreased, scholarships from osteopathic associations, State governments and other non-Federal sources doubled during this period, from 26 to 54 percent of all awards. Of this 54 percent, o .eopathic associations provided 6 percent of 1983-84 scholarships, State governments provided 14 percent, and other sources contributed 34 percent.

During the 1979-80 academic year 70 percent of the loans students made were obtained under federally-subsidized loan programs--Guaranteed Student Loans (GSLs) accounted for almost half of all loans, while National Direct Student Loans represented 12 percent and Health Professions Student Loans 10 percent. In 1983-84, Federal loan programs accounted for 84 percent of student loans, but federally-subsidized loans had decreased to 59 percent of total financial assistance while almost 25 percent of student loans were nonsubsidized loans under the Health Education Assistance Loan (HEAL) program. HEAL loans accounted for 50 percent of total loan funds borrowed in 1983-84.

Dentistry

Like other health professions students, dental students have increasingly utilized loans to finance their education. More than 95 percent of all seniors borrowed from at least one loan source in 1984 (Solomon, 1984). Since 1978, the distribution of loan sources utilized by dental students has changed noticeably (Table 9). The percent of students using National Direct Student Loans more than doubled from 19 percent in 1978 to 39 percent in 1984. In the same period, the percentage of students using Federal health professions loans dropped from 44 percent to 38 percent, while Guaranteed Student Loans rose from 54 percent to 87 percent and Health Education Assistance Loans rose from 6 percent (in 1979 when the program began), to 26 percent in 1984. Use of personal bank loans declined in this period from 14 percent to 8 percent and family and other loans rose from 41 percent to 54 percent (Solomon, 1984).

From 1978 to 1984, the proportion of dental students receiving scholarships and grants has remained fairly stable at around 40 percent. However, the sources of these scholarships has changed during this period. The percent of students receiving Armed Forces Health Professions scholarships decreased from 7 percent in 1978 to .2 percent in 1984. National Health Service Corps scholarships were awarded to 2 percent of dental students in 1978 rising to 5 percent in 1982 but dropping to 3 percent in 1984. The percent of students receiving State scholarships or grants dropped from 13 percent in 1978 to 9 percent in 1984 while school scholarships or grants increased from 16 percent to 20 percent (Solomon, 1984).

Families contribute significantly to finance the dental student's education. Among graduates in 1979-81, the average family contribution per student was $3,680 while family loans averaged $3,684. The average size of family gifts varies greatly with family income. In 1979-81, the average gift amount from families earning $10-20,000 per year was $1,973 while the average gift amount for families earning over $80,000 per year was almost $11,000 per student (House, 1985).

Spouses contribute significantly to the financial pool of married dental students. During the period 1979-81, among those students who had spouses earning income, the mean earned spousal income was over $30,000. In contrast, among all students who worked, total earnings were only $9,000 and total other income was about $11,000 (House, 1985). Thus, spousal income of married dental students is a very significant part of total married student income.

Table 9 - Percent of Dental Students Using Loans to Finance Education by Type of Loan

Source	1978	1979	1980	1981	1982	1983	1984
Federal Health Professions Loan	43.5	39.8	35.3	37.7	34.8	34.9	38.2
National Direct Student Loan	18.7	23.4	28.9	33.9	35.3	36.4	39.1
Guaranteed Student Loan	54.4	57.4	64.0	71.1	82.2	86.1	87.4
HEAL	N/A	5.8	9.4	16.5	17.7	21.4	25.6
Personal Bank Loan	13.9	12.5	10.7	9.6	8.8	8.9	8.3
Family and Other Loans	40.7	N/A	67.6	61.1	52.4	54.5	54.1

SOURCE: Solomon, Eric. Senior Survey Update: "Financial Characteristics of Dental School Seniors, 1984." J. Dent. Ed., Vol. 48, No. 9, 1984

Optometry

During the 1977-82 period increasing numbers of students sought financial assistance (ASCO, September 1984). Borrowing increased in the public institutions from an average of 33 percent of the student body in 1977-78 to 49 percent in 1981-82. At independent schools, borrowers using institutional resources increased from 38 percent to 61 percent of the student body.

The total available loan, scholarship and other funds administered by the schools accounted for less than 30 percent of the average student expenses during the academic year. Students thus had to call on other funding sources as well as savings, earnings, and spouse's income for the larger amount of required expenses.

According to recent data gathered from institutions in optometry by Applied Management Sciences (AMS, 1985) the level of borrowing as a percentage of total student educational costs ranged from 76 percent for first-year students to 88 percent for fourth-year students.

Podiatric Medicine

Table 10 summarizes the trends in financial aid received by podiatric medical students. The proportion of students receiving aid increased from 49 percent in 1974-75 to 93 percent in 1984-85 and the average amount of aid per student increased ninefold from $1,500 to $13,500 during the same 11-year period. Over 80 percent of student financial aid in 1984-85 came from Health Education Assistance Loans (HEAL) and Guaranteed Student Loans (GSL) (Table 11). Although GSL is the preferred program, borrowing limits have required podiatry students to obtain over half of their total aid from the HEAL program. The shift from GSL to HEAL occurred in 1983 for many students when an income cap of $30,000 was initiated by the GSL program.

Table 10 - Financial Aid Provided Through Colleges of Podiatric Medicine, 1974-75 to 1984-85

	1974-75	1979-80	1981-82	1983-84	1984-85[b]
Number of Students Receiving Aid	905[a]	2,045	2,393	2,331	2,463
% of Enrollment	49	81	93	89	93
Total Aid ($000)	1,348	12,467	21,542	29,446	33,022
Average Aid Per Student	1,500	6,100	9,000	12,600	13,500

a/ Estimated
b/ Projected

SOURCE: Howard, Suzanne H., Podiatric Medical Education: A Statistical Report. Journal of Podiatric Medical Education 15:(1), Fall 1985

Table 11 - Financial Aid Received by Students at the Colleges of Podiatric Medicine, Academic Year 1984-1985

Source	Total Amount	Number of Students	Avg. Student
Hlth. Ed. Assist. Loans (HEAL)	$17,515,918	1,515	$11,538
Guaranteed Student Loans (GSL)	11,051,753	2,242	4,929
Nat. Dir. Student Loans (NDSL)	1,971,436	1,026	1,921
PLUS/ALAS Loans	1,639,744	553	2,965
Hlth. Prof. Std. Loan (HPSL)	806,674	773	1,043
College Work Study	495,370	480	1,032
College Funds	393,586	569	691
Other[a]	207,862	173	1,201
State Funds	179,335	160	1,120
Excep. Fin. Need Schol. (EFN)	114,554	6	19,092
TOTALS	$ 34,376,232	2,463	$13,957

a/ Includes grants, loans, and work from outside sources.

SOURCE: Unpublished data from the Annual Survey of Colleges of Podiatric Medicine (AACPM, 1985)

TRENDS IN INDEBTEDNESS

While the availability of loans has provided a means for financing a relatively expensive health professions education, the necessity of borrowing increasingly larger amounts at higher rates in order to cover rising costs, is resulting in increasingly high levels of student and graduate indebtedness. There is evidence of rising indebtedness in all disciplines as the following discussion of discipline specific trends indicates. The mean educational debts of senior medical students increased from $17,200 to almost $27,000, in current dollars, between 1980 and 1984. During this period, the number of students reporting debt rose from 77 to 88 percent of the senior class. The number of students reporting debts of $30,000 or more increased by half between 1983 and 1984, reaching 36 percent of 1984 graduates (JAMA, 1985).

Private medical school students have significantly higher debts than public medical school students. In 1981-82, medical students attending private schools had median educational debts of $24,200. By 1983-84, their debts had increased 22 percent in current dollars, to $29,900. Median debt among public medical school students rose 19 percent during this period, from $19,000 to $22,700. The median debt accumulated by students attending private medical schools in 1983-84 was 30 percent greater than that of their public school counterparts (Table 12). It has been estimated that a continuation of the current rate of increase in the mean debt of private medical school graduates would result in average debt level in 1992 of $78,200 in current dollars.

The proportion of senior osteopathic students graduating with debt has remained at about 92 percent over the last several years. However, the level of indebtedness has increased significantly. Within the one-year period between 1983 and 1984, the average indebtedness of graduating students increased 30 percent, from $31,000 to $40,000, while the proportion of students who indicated they owed $40,000 or more increased from 25 to 43 percent of the senior class.

Students who attended private osteopathic medical schools have higher debts than those attending public schools. In 1982-83, seniors who attended public osteopathic medical schools had an average educational debt of $25,400 while the average debt of their private school counterparts, at $33,500, was higher by one-third.

Between 1984 and 1985, the average debt for all graduating dental school seniors increased by more than 13 percent to $36,300. During that year, debt for seniors at public dental schools increased 8 percent, at State-related private dental schools by 13 percent and at other private dental schools by 16 percent. Between 1978 and 1985, the average debt of graduating dental school seniors increased 70 percent in inflation-adjusted dollars.

A study of educational loan indebtedness at one Midwest school of optometry indicated that the level of indebtedness among graduates of that school is increasing steadily. In 1981, for example, the average

Table 12 - Mean Debt of Senior Medical Students for All, Public and Private Schools, 1982-1984

Year	All Schools	Public	Private	Percent in Debt
1982	$21,051	$18,944	$24,214	83
1983	23,647	20,249	26,535	88
1984	26,496	22,655	29,922	88

Includes all Senior Students

SOURCE: Association of American Medical Colleges, Division of Student Programs, 1986

amount of loan indebtedness was $18,265; in 1983 the figure had risen to $24,710. In 1982, 95 percent of the graduates had educational loan indebtedness.

Table 13 shows the average level of accumulated debt incurred by podiatry students in 1985 by academic year. Student indebtedness increases from $5,500 at entry to nearly $50,000 at graduation (AACPM, 1986).

According to annual surveys of the graduating classes of schools of veterinary medicine, the level of indebtedness of those students is also increasing steadily. The mean educational indebtedness of 1985 graduates was $22,252, up 8.3 percent from the level of $20,540 for the 1984 graduates, which in turn represented a 8.7 percent increase over the level of $18,897 for 1983 graduates. The proportion of veterinary graduates who are over $20,000 in debt has increased significantly from 26 percent of all graduates in 1983 to 42 percent in 1985 (Wise, 1986).

Two recent studies have shown that student debts are increasing for those with public health degrees. Also, one study reported that the average student graduated with a debt of $4,600 which is relatively low when compared with disciplines discussed earlier. However, this figure did not include debts they may have incurred in obtaining their basic medical, engineering, or other degree. The same study also showed that over 50 percent of the students depended on traineeships, scholarships, fellowships, and grants as the primary source for financing their education. The study concluded that, "Most of these monies come from Federal programs, and I think we will continue to see schools of public health rely upon these funds" (Licwinko, 1982).

A study of health administrators employed in 1979-1983 reported that the 1983 graduating class had an education-related indebtedness of $8,500, up more than 50 percent since 1981 (Korn/Ferry, 1984).

Table 13 - Average Indebtedness of Students in Colleges of Podiatric Medicine, 1985

Time of Debt	Average Indebtedness (7 Schools)
At Entrance	$ 5,509
After First Year	14,788
After Second Year	26,766
After Third Year	41,521
After Fourth Year (Graduating Class of 1985)	49,213

SOURCE: American Association of Colleges of Podiatric Medicine. Written communication. Rockville, Maryland, 1986

EFFECTS OF COSTS, CHANGES IN FINANCIAL ASSISTANCE AND INDEBTEDNESS

It is expected that the effects, if any, of financial factors on the decisions that individuals make with regard to health professions careers would be manifested in a number of areas. The discussion that follows addresses those areas which are presented in the literature on this topic.

Applicant Pool and Admissions

The decision to pursue an education in the health professions is affected by a number of social as well as financial factors. Some of the most important financial factors include the cost of the education (both direct in the form of tuitions and fees and indirect in the form of foregone earnings), availability of funds to finance the education and the future income prospects of the particular profession chosen. While the previous discussion has focused exclusively on the trends in the direct costs of education to the student in terms of the expenses of tuitions, etc., in the analysis of the relative effects of financial factors, it is important to consider that the indirect costs may also be significant. Those indirect costs primarily include foregone earnings which students could have received had they entered other professions requiring fewer years of training. For example, in 1983 the average beginning salary for engineers with a bachelor's degree exceeded $20,000 a year. Thus, health professions students could conceivably have earned income in other occupations during each year they spent in their health professions studies. In a profession such as medicine where the training period including residency may be particularly long, foregone earnings could be especially substantial. Therefore, indebtedness when placed in perspective with foregone earnings and the expectation of future earnings in these professions may not be the predominant financial factor in career choice.

It has been determined that in at least one profession (dentistry) the rate of return to the profession, which compares the full financial rewards from the profession to that of alternative professions, has decreased (Dunlevy, 1984; Nash 1982) and this development along with other trends has been cited as contributing to a 65 percent decline in the number of applicants to dental schools in the past decade (American Dental Association, April 1986).

As is the case for dentistry, the number of applicants to most health professions schools has declined and it has been suggested that trends in the costs of education and prospects of high indebtedness have played a part in this decline. There were 33 percent fewer applicants to medical schools for academic year 1985-86 than in 1974-75 the peak year of competition for entry into medical school. Similarly, the most recent counts of applicants to schools of optometry are nearly half the peak level reached in 1975-1976. Declines in the veterinary medicine applicant pool have been particularly sharp in recent years amounting to about 24 percent between academic years 1980-81 and 1984-85.

However, there have been no studies which have determined the extent to which financial factors (direct or indirect) rather than demographic or

other factors such as reports of possible surpluses in some professions have affected these trends.

Rising educational costs have also raised concern about the effects on the maintenance of the socioeconomic diversity of students enrolled in health professions training programs. It has been hypothesized that increased health professions education costs without sufficient low cost alternatives to financing would prevent all but the most affluent individuals from pursuing a career in these professions and would have a negative effect on efforts to increase the representation of qualified low income and underrepresented minority individuals in training programs. While there are no studies to date which fully support these hypotheses, there are some indications that changes may be occurring in the economic composition of the applicant pool and of the matriculants to these institutions in that a growing proportion of applicants and admissions to health professions training programs are from high income families.

Data on the parental income of applicants taking the Medical Careers Aptitude Test (MCAT) show a decline in the number of students from low and lower middle income families. Moreover, in comparison to the income distributions of families in the United States, a disproportionate share of recent applicants are coming from more affluent families. In 1977, 3 percent of the national applicant pool, compared to 2 percent of U.S. families at that time, had a family income of $50,000 or more. By 1985 the proportion of medical school applicants in this category had increased to 38 percent while the fraction of all 1985 U.S. families with an income this high had increased to only 16 percent.

Although the total applicant pool has decreased, comparisons of 1981 and 1985 medical school applicants indicate that low income nonminority applicants are disappearing from the applicant pool at a faster rate than low income underrepresented minority applicants. The changes over this four-year period show an 84 percent reduction in low-income nonminority applicants compared to a 44 percent decline in low income underrepresented minority applicants. During the same period, the proportion of families in the U.S. who earned less than $15,000 decreased from 33 to 25 percent among white families and from 62 to 46 percent among black families (Boerner, 1983 and Unpublished AAMC data). In addition, there is an apparent trend toward increasingly higher acceptance rates for more affluent applicants and a concomitant decline in the acceptance rate for low income applicants. In 1974, one-third of all applicants each came from families who earned less than $15,000, and 31 percent of these applicants were accepted into medical school. An additional one-third of applicants were from families earning over $30,000 and 40 percent were accepted. About 18 percent of all 1981 applicants came from families earning less than $15,000 and 15 percent were accepted. Almost 46 percent were from families earning more than $30,000 and 51 percent of these applicants were accepted (Boerner, 1983). Recent data also indicate a change in family income levels of students in schools of optometry. A five-year trend survey performed at the Southern California College of Optometry shows a significant increase in the number of students with families having incomes exceeding $30,000

and a decrease in the number of students with families having incomes between $12,000 and $29,000 (ASCO, September 1984). Moreover, in 1979-80, for example, only 9 percent of the families of applicants for financial assistance had incomes of more than $30,000; by 1983-84 that figure had risen to 50 percent and of that 50 percent, 25 percent had incomes exceeding $45,000.

A cause and effect relationship between such changes in the applicant pool and educational costs and indebtedness has yet to be defined. In a study of the effect of high tuition on applicants and enrolled medical students at Georgetown University School of Medicine researchers found that overall the sudden rise in tuition and corresponding financial aid requirements caused little change in socioeconomic diversity of matriculants (Ayers et al., 1981). A point of note is that the major support for students at this school was from Federal scholarships with a service commitment. Therefore, the effect of the curtailment in availability of such support on future matriculants remains to be seen.

Practice

The income of health professionals may vary considerably according to the type of practice chosen (i.e., private practice, academia), the specialty chosen, and the area in which the practice is located. As a result it has been hypothesized that with increasing levels of educational indebtedness graduates from health professions training programs would be more likely to choose those practice situations which offered the maximum remunerative potential.

Specialty of practice is one area in which substantial income variations may be found. As illustrated in Table 14 net physician incomes in 1984 varied from $71,100 for general family practice physicians to $151,800 for surgeons. Medical specialists have higher incomes than generalists despite comparable work weeks and a slight difference in the number of hours worked per week. Similarly, virtually all published reports which present average net incomes among general dental practitioners and specialists show that the average earnings of specialists at any specific age in the career path generally exceed those of general practitioners.

Because of the income differentials among practitioners of different specialties and the steadily increasing educational expenses and indebtedness of health professions students, there has been concern that students may consider the relative financial returns of practice as a major determinant of specialty choice. Such decisions would possibly have a negative effect on efforts to provide adequate access to primary care. Studies to date do not support the contentions that levels of indebtedness have a substantial effect on specialty choice.

Although practicing dentists who specialized reported that they had higher levels of debt at graduation than those who did not specialize (House, 1985), most studies in the area of medicine have found little, if any, relationship between overall indebtedness and specialty choice. However, one study of medical residents who graduated in 1983 examined the relationship between debt and specialty choice by differentiating the type of debt and found that an increase in federally-subsidized loans (GSL, NDSL, and HPSL) slightly increased the probability of selecting a

Table 14 - Comparison of 1984 Physicians' Net Income by Specialty of Practice and 1983 Seniors' Mean Debt by Specialization Plans

	Physicians 1984 Net Income	1983 Seniors Mean Debt	
		Private	Public
Specialty			
General/Family Medicine	$ 71,100	$23,859	$20,388
Internal Medicine	103,200	27,325	21,463
Surgery	151,800	29,239	21,032
Pediatrics	74,500	26,944	19,841
Ob/Gyn	116,200	28,709	21,762
Radiology	139,800	29,529	23,652
Psychiatry	85,500	27,115	21,535
Anesthesiology	145,500	29,974	21,302
Mean	$108,400	$27,642	$21,098
Type of Practice			
Solo	$103,800	$29,306	$22,512
Nonsolo	111,900	29,054	21,233
Faculty			
Basic	$ 42,400		
Clinical	$ 75,000		
Administration	N/A	$30,269	$13,821
Research	N/A	$24,621	$22,564

SOURCE: Association of American Medical Colleges, 1983 Graduation Survey and American Medical Association, Socioeconomic Monitoring System, 1985

primary care specialty among nonwhites but had no effect on the specialty choice of whites. An increase in debt from HEAL loans had the opposite effect; it reduced the likelihood of choosing a primary care specialty, regardless of race. Finally, this study found that debt from sources other than nonsubsidized and subsidized Federal loans had a small positive effect on the probability of selecting primary care. Although these analyses showed the type of debt accumulated had a significant effect, their influence on specialty choice was small; a $10,000 increase in HEAL debt decreased the probability of choosing primary care by 7.5 percentage points while a $10,000 increase in subsidized debt increased the probability of selecting primary care by 5.3 percentage points among nonwhites (Bazzoli, 1984).

Incomes also vary by type of practice and practice location. For example, in 1984, physician solo practitioners earned less than non-solo practitioners, $103,800 and $111,900, respectively. Physicians located in metropolitan areas with populations under one million earned the highest salaries, $115,100 compared with $106,400 for physicians whose practices were located in metropolitan areas with more than one million population. Physicians in nonmetropolitan areas earned $90,900 (AMA, 1985).

Physicians who are employed in academic settings generally have incomes below most of their practitioner counterparts. The average annual income of basic science faculty in 1984 was $42,400. Clinical science faculty earned a substantially higher average annual income than basic science faculty, over $75,000, because members of this group have access to earnings from their medical practice in addition to other university resources (JME, 1985).

Such variations in remuneration coupled with rising debt loads have raised concerns about the health professionals' willingness to practice in areas of health care underservice, and in academia where incomes have traditionally been lower than in some other areas. However, there is no evidence that indebtedness is substantially influencing such decisions.

Determining influences on choice of a practice is very complex and many studies have been done to assess the importance of various factors in location decisions. There is evidence that the income earning potential of a location is important. But there is no evidence that indebtedness affects the location decision. For example, a recent study showed no relationship between level of indebtedness of dental school graduates and the probability of locating in a dental manpower shortage area (House, 1985).

Early Practice Years and Residency Years

Although substantially higher earnings can be expected as their practices mature, the early years of practice of the new health professional with a relatively large educational debt may be financially difficult. A study simulating the debt burden pattern of graduates from medical (MD and DO) dental, optometry, and veterinary medicine schools indicated that except for MDs accumulated educational debt will be of such a magnitude relative to expected earnings in the initial years of practice that repayment of

the loans could be difficult for 40 to 75 percent of these graduates. Even under more optimistic alternative assumptions about the proportion of graduates' income available to repay educational debt of graduates, these percentages range from 20 percent to 40 percent (AMS, 1985).1/

While the AMS study found MD physicians to be much less likely than other professionals to be at economic risk during early practice years, there may be difficulties with the repayment of loans during the residency years. About 98 percent of current medical school graduates pursue specialty training in graduate medical education programs for an average of about 4 years. While the payment of HEAL is deferred until residents enter practice, interest accrues during residency and GSL and NDSL have only 2 year deferments so repayment often begins during residency. Repayment for some may be made difficult by the relatively low stipends received by residents. For example, in 1982-83 residency stipends ranged from an average stipend of $18,700 for first-year residents to $22,000 for fourth-year residents.

While effects such as low starting salaries are not long term, they are nonetheless noted as financial factors which may be influential during this period of the health professionals' career.

In addition to financial difficulties associated with the repayment of loans during the early years of practice, some studies have noted another short-term difficulty associated with financial factors--the establishment of a private practice.

Income potential is greatest for dentists in private practice as owners of a practice. Eighty-two percent of graduating dental school seniors in 1985 expect to eventually own all or part of a private dental practice. (Solomon, 1985). Five years after graduation, 73 percent of 1979 graduates were complete or part owners of a private practice. The higher the level of annual educational debt payment, the more likely the dentist is to be an owner of a dental practice. However, the average annual payment of educational debt by dentists who own all or part of a dental practice is only about one-fifth of the average annual payment for buying the practice. Thus, among dental practice owners, five years into practice, educational debt is relatively unimportant in the context of total debt (House, 1985).

Some graduates of schools of optometry suggested in a 1982 survey that indebtedness was a major factor preventing the achievement of a self-employed practice. The most frequently cited difficulty in establishing a practice was that large debts incurred from educational expenses created a barrier in the financing of a practice (35 percent). The next most frequently cited difficulty related to problems in obtaining the necessary capital to finance a practice (25 percent). These survey results suggest that the economics of financing a practice, and prior existing debt, have made the attainment of a self-employed status more difficult.

1/ The methodology of this study does not explicitly account for the graduates' ability to deduct interest paid on their loans from their income taxes, and the effect that this may have on the percentages derived is unknown.

The above survey covering the optometry classes of 1979, 1980, and 1981, shows that the trend among recent graduates is in the direction of self-employment.

When the data are examined by year of graduation, the proportion of self-employed practitioners increases rather sharply from the first year after graduation (44 percent) to the third year after graduation (63 percent). Conversely, the proportion of graduates in a salaried position decreases over time after graduation, in about the same proportion as the increase in the self-employed category. These survey data suggest that some graduates enter a salaried position after graduation because of educational indebtedness or inability to raise needed capital. Subsequently, they overcome such obstacles and move toward their professional preference, self-employment.

Table 15 shows average educational debt of U.S. veterinary medical college graduates by selected types of employment for the three most recent years. In 1985, with the exception of advanced study, veterinarians exclusively in small animal practice had the highest educational indebtedness. Those in large animal predominant practice had the lowest level of educational debt.

A survey of 1985 pharmacy graduates by the American Druggist Magazine reported that drug chains employed more than one-third (35 percent) of the new graduates. The proportion of new pharmacy graduates employed by drug chains (28 percent of 1980 graduates) has been increasing gradually in recent years. Conversely, the proportion of new graduates in independent pharmacies has been decreasing in recent years, down to 21 percent of 1985 graduates. The proportion of new pharmacy graduates employed by hospitals (26 percent of 1985 graduates) has remained stable over the last few years. The increasing proportion of new pharmacy graduates employed by drug chains is likely due to higher salary levels offered by drug chains which in turn may cause fewer graduates to work in independent pharmacies, hospitals, and other career fields, such as government and teaching. There are, however, no studies which demonstrate the relationship of these trends to increasing indebtedness.

In the area of public health the relatively low salaries in the face of increasing student debts is also an issue. Graduates of schools of public health in 1981 commanded an average entry-level salary of $24,500. In contrasting this with other fields, one study concluded that, ". . . public health is still a field that pays only modest earnings in comparison to other fields of the health professions" (Licwinko, 1982). Median salaries in local health departments in 1982 were: Public Health Nurse $16,000; Sanitarian $17,000; Health Educator $18,000; and Public Health Physician $48,000 (American Public Health Association, 1982). Even the physician salary is unattractive in contrast to the approximately $100,000 that physicians earn on the average in private practice settings (AMA, 1983).

A study of 1978 and 1979 graduates of schools of public health, concluded that, "The actual rate of return of a public health degree over the entire working lifetime is probably limited or even negative. Due to the

Table 15 - Average Educational Debt of U.S. Veterinary Medical College Graduates by Selected Types of Employment: 1983, 1984, and 1985

Type of Employment	Average Educational Debt		
	1983	1984	1985
Large Animal Predominant	$18,648	$19,551	$20,582
Mixed Animal	18,539	19,668	21,395
Small Animal Predominant	18,960	20,191	21,414
Small Animal Exclusive	20,160	20,854	22,429
Equine Predominant	20,360	20,013	20,974
Advanced Study	19,025	22,324	23,308
Self-Employed	17,004	24,061	21,825

SOURCE: Wise, J.K. "Economic Note." Journal of the American Veterinary 183:12, December 15, 1983; 185:8, October 15, 1984; and 188:2, January 15, 1986

high portion of graduates who work in public and voluntary sectors, subsequent real increments to income over time may be gradual and peak earlier than in such professions as medicine, dentistry, law, and business" (Hall, 1982).

These findings coupled with increases noted in indebtedness levels in recent years have raised concerns that new graduates will be forced to seek more lucrative employment in the private sector and in clinical practice, making it increasingly difficult to recruit professionals into certain public health specialties which are already in short supply. Additional studies would be needed to define the effects, if any, of comparatively low salaries and rising indebtedness on the career patterns of public health personnel.

Career Plans of Students and Recent Graduates

The preceding discussion involves analyses which have largely drawn on retrospective data where motivations are inferred from observed behavior and characteristics. Studies of the future plans of students or those who have just completed their training present another perspective by providing information based on stated intentions or motivations. As is true of most data in this area information is available almost exclusively for medical and dental students.

Some analysts assume that economic necessity may increasingly be a determinant of a health professional's career choice, given the large growth in the supplies of health personnel and warnings about pending oversupplies, increasing competition, income disparities among specialists, and the increasingly larger debts of recent health professions graduates. However, the direction these forces may take is not clear. For example, contradictory hypotheses explaining the relationship between medical students' indebtedness and their career choices anticipate that either high debt will influence students to specialize in one of the higher paying specialties and practice in large metropolitan areas, or, to select a specialty which requires a minimum number of years for specialty training, such as family practice, general pediatrics, or general internal medicine. Similarly, among dentists the hypotheses are that the new graduate would choose to specialize in order to earn more for debt payoff or, althernatively, to enter practice sooner to begin paying debt earlier.

Although most studies to date do not support the contention that increased debt will decrease the number of physicians in primary care, there are indications from student surveys that career choices may be affected in the future. The results of a study of students enrolled in medical school during the 1983-84 academic year found that 45 percent of first-year students, compared to 31 percent of fourth-year students, indicated that anticipated debt would be a determinant in their selection of a specialty (AAMC, 1986). The study further found that students attending private medical schools and medical schools in the northeast U.S., where tuition charges are highest, were most likely to indicate that expected debt would be a determinant of their specialty selection.

This study suggests that indebtedness may have an increasingly larger role in future medical school graduates specialty selection and other career decisions.

Several studies which have examined the relationship between fourth-year medical students' debt and their career choices have found variations between medical school debt and career plans. However, debt variations within career categories are usually not large and may not explain how physicians make their career choices. Debt has not been found to be as critical a determinant of career choices when other factors, such as students' socio-demographic characteristics, are considered. Several studies have found strong relationships between students' personal characteristics and their career choices without finding as strong a relationship for indebtedness (AMA, 1983; French, 1981; and Hough, 1981).

The AMA conducted a study on the impact of rising educational debt on medical school graduates specialization and career plans and found some significant variations between debt load, some career choices and the type of school these graduates had attended: the lowest average debt ($14,400) was incurred by those who intended careers in a government agency, but those graduates who expected careers as academic faculty had the highest average debt ($21,270). Because academic careers generally pay less than clinical practice, this finding did not support the hypothesis that those students with large debt may choose higher paying careers. Although the difference between the highest and lowest average debt was statistically significant, the report concluded that these variations may not explain how future physicians choose their careers (American Medical Association, 1983).

A series of studies supported by the Department of Health and Human Services (DHHS) and conducted by the AAMC have also provided information on the relationships between indebtedness and career plans among senior students who graduated from U.S. medical schools between 1974 and 1984. The first study, conducted among 1974-75 senior students, found that women, underrepresented minority group members, married students with children and those from rural areas or small towns had the largest amount of debt and were more inclined to plan to establish practice in a medically underserved area (Mantovani, et al., 1976).

The study of 1978 through 1982 senior students found that 1981 and 1982 graduates who chose to practice in cities with 500,000 or more population had higher debts, about $22,000, than those stating preference for small towns at $18,000. Among 1978 through 1981 graduates, those planning teaching or research careers reported lower debt than those opting for private practice, but there was little indication that highly indebted seniors planned to go into the higher paying specialties. Among the 1982 graduates there was some indication this had changed: graduates with the highest average debt were planning to specialize in allergy-immunology ($25,200), anesthesiology ($24,300), ophthalmology ($23,200), and to pursue careers in full-time research ($24,300) or administration ($26,700). The study findings further indicated that sex, marital status, and attendance at a private school were more powerful predictors of who would select primary care or a higher paying specialty than indebtedness (AAMC, 1984).

The study of indebtedness and career choice among 1983 medical school graduates found that higher average debt was associated with a tendency to choose a non-primary care ($35,300) rather than a primary care specialty, to prefer an urban or suburban practice ($33,600) rather than a town or rural ($29,700) location. Higher debts were also associated with plans for a career in research ($28,600) or administration ($30,000) than in clinical practice ($23,600) among seniors attending private schools. Students who indicated they were willing to serve in a socioeconomically deprived area had lower average debts than others. However, this finding was attributed to the high proportion of underrepresented minorities with relatively low debts indicating they would serve in these areas rather than to any direct effects of indebtedness (AAMC, 1985).

This study also found that seniors attending private medical schools who were planning residencies with five or more years of training and those planning a transitional year of graduate medical education had the highest mean debts, $28,100 and $28,900, respectively. The analysis of career activity preferences showed that public school students with the highest mean debt planned to enter a nonclinical area. Private school seniors planning academic careers also had relatively high mean debt, $28,100, which was exceeded slightly by students who planned to enter private clinical practice, $29,300.

In a survey of 1983 osteopathic medical school seniors half the students stated that their financial situation was a factor in their decisions concerning their post-graduate plans and there are observable differences in some cases between those with high and low indebtedness. However, the average indebtedness of these seniors differed by less than one percent between those choosing primary care and those selecting a non-primary care specialty. The study notes that slightly less than one-half of these graduates were planning to enter primary care whereas traditionally the percentage of osteopathic students entering primary care has been much higher. However, the relationship of this occurrence to financial factors is not demonstrated in the study. With regards to location plans, about one-third of these seniors considered their financial situation as on influence on location choice and most of these considered it only a slight influence (AACOM, 1986).

Evidence from a survey of dental school graduates indicates that dental school seniors who plan to enter postgraduate programs carry higher levels of debt than those not planning to take postgraduate training. However, "income potential" was mentioned by only eight percent of dental graduates planning to specialize as the most important factor in the decision (Graham and DeMarias, 1976). While indebtedness appears to be correlated positively with a tendency to specialize, the relationship is not simple, and other factors are important in the decision.

Although data from the late 1970s and early 1980s indicated that dental students' plans for post graduation employment were strongly affected by financial indebtedness (American Association of Dental Schools, 1980, 1984), more recent data show a decreasing relationship. From 1983 to 1985 the average debt of graduating dental students increased by over 25

percent, while immediate postgraduation plans remained relatively stable. There does appear to be a drift toward group private practice and away from solo private practice in both immediate and long range plans of graduating dental students. However, 4 years after graduation, among practitioners in an ownership position, more are solo practitioners than planned. Only 44 percent of 1980 dental school graduates expected to be in solo dental practice by 1985. By 1984, over 63 percent of 1980 graduates had already established a solo dental practice (Solomon, November 1985).

Economically Disadvantaged and Underrepresented Minority Students

Since the 1960s there have been a number of programs established to provide access to careers in the health professions for economically disadvantaged individuals and those minorities who are underrepresented in the health professions work force and training institutions. Several studies have acknowledged the effectiveness of these programs in increasing the number and proportion of minority and low-income health professions students and practitioners during the 1960s and early 1970s (Keith, 1985; Bazzoli, et al., 1986; Shea and Fullilove, 1985).

One study examining the effectiveness of Federal health manpower programs of the 1960s and 1970s in increasing access to medical school found that, regardless of ethnic background or race, students from socioeconomically-disadvantaged families were able to enroll in even the most expensive medical schools and graduate without much more debt than students from families with more resources. They concluded that because these programs were successful in enabling economically-disadvantaged individuals to enter medical school, their elimination would have a negative impact on low-income individuals (Bazzoli et al., 1986).

Other researchers have voiced concern that a continuation of the current trends in educational costs and financing mechanisms will disproportionately affect low-income and underrepresented minority students. It is argued that these individuals generally have fewer economic resources available to them than do other students and their enrollment is considered to be more affected by the types of financial assistance available (Hanft, 1985; Sullivan 1986). Declines in the percentages of low-income applicants and acceptees to medical schools have been offered as evidence that a change in socioeconomic background in medical schools may already be underway. However, in the absence of studies examining all factors which may be affecting these changes it is difficult to determine the contribution of financial considerations.

Interest in increasing or even maintaining the level of underrepresented minority enrollments in health professions training programs goes beyond the issue of equity of access to these careers. Studies have shown that practitioners from underrepresented minority groups are more likely to locate in low-income areas and to provide services to underserved areas and populations (Keith, 1985; U.S. DHHS, 1985). Therefore, increasing the numbers of such practitioners appears to be beneficial to the national goals of increasing access to health services for certain segments of the population.

The continually rising educational costs and indebtedness are perceived by some observers as a threat to progress in increasing or even maintaining the gains that have been made in improving the representation of these groups in training programs and in the work force. Although some progress has been made, the goal of obtaining minority enrollment in health professions schools equivalent to their representation in the U.S. population has not been achieved and the representation of some minority groups among the supply of health professionals lags even further than among enrollments. For example, in 1983-84, Blacks accounted for 12 percent of the U.S. population but only an estimated 3 percent of the Nation's physicians and 6 percent of new medical school entrants.

Hispanics represented 6 percent of the Nation's population and 3 percent of 1983 first-year medical students. Moreover, Black physicians, dentists, and pharmacists and Hispanic dentists and pharmacists were all less than one-quarter of equivalency with their representation in the U.S. population in 1985 and, even at current rates of increase in enrollment, they are projected to be no higher than one-third equivalency in the Year 2000 (U.S. DHHS, 1986).

Despite the apprehensions regarding the possible disproportionate effects of financial factors on minority enrollments, data indicate that there is currently little difference in the overall average indebtedness of minority and nonminority medical school graduates. Reports published by the Association of American Medical Colleges (AAMC) indicate that the disparity between the mean debt of underrepresented and nonminority students has diminished since 1981, with current debt levels closely approximating each other. In 1983, the mean debt of nonminority senior medical students was slightly higher at $23,700 than that of underrepresented minorities, $22,300. The proportion of nonminority students in debt increased from 73 percent to 86 percent of senior students between 1978 and 1983 while the proportion of underrepresented minorities in debt during this period remained about the same at 92 percent (see Table 16).

The proportion of underrepresented senior minority medical students in debt for over $30,000 more than doubled during this period, from 11 to 25 percent of senior students. For nonminority senior students, the increase was even greater, from 6 percent to 25 percent of graduating students (Table 17).

An analysis of minority and nonminority students attending private and public medical schools found that there were no differences between underrepresented and nonminority senior year debt levels among those who attended public schools. However, the mean debt level of underrepresented minorities in private schools was lower than that of nonminorities. This finding was partially attributed to the higher proportion of underrepresented minority students who attended medical school during the peak years of the NHSC program and received these scholarships for all four years of medical school (AAMC, 1985).

Table 16 - Mean Debt of Minority and Nonminority Medical School Seniors for Students Selected Years

	MINORITY		NONMINORITY	
	Mean Debt	Percent in Debt	Mean Debt	Percent in Debt
1978-79	$16,880	92.5	$15,504	72.6
1979-80	18,350	90.1	17,125	76.0
1980-81	20,672	90.4	19,603	76.0
1982-83	22,325	91.0	23,732	86.0

Includes only indebted senior students

SOURCE: Association of American Medical Colleges, Office of Minority Affairs, Facts and Figures I and II, November 1983 and March 1985

Table 17 - Percent Distribution of Underrepresented Minority and Nonminority Medical School Seniors by Level of Indebtedness for Selected Years

	None	$1 - $9,999	$10,000 $19,999	$20,000 $39,999	$30,000 $49,999	$50,000 or More
1978-1979						
Minority	7.5	22.2	36.6	22.5	10.4	0.9
Nonminority	27.4	20.8	29.0	16.7	5.7	0.3
1980-1981						
Minority	9.6	19.4	27.5	21.4	18.6	3.6
Nonminority	24.0	13.2	27.4	21.4	12.6	1.4
1982-1983						
Minority	9.0	19.3	24.0	22.6	20.4	4.5
Nonminority	14.0	9.4	24.8	27.2	20.0	4.7

SOURCE: Association of American Medical Colleges, Office of Minority Affairs, Facts and Figures I and II, November 1983 and March 1985

While available data indicate a decline in the percentage of low-income minority applicants and acceptees to medical schools (see Table 18),[1/] the pool of minority applicants to medical schools has remained stable in recent years in terms of overall numbers whereas the trend in the total applicant pool has been downward. Authors of a previous study finding no discernible effect of tuition increases on the applicant pool for minorities suggested that the availability of financial aid kept the pool at a stable level (Yoder, 1983).

During a recent series of nationwide workshops on career choices of minority students, minority student and counselor participants spoke of the influence these increased costs and potential debt can have at all educational levels. It was the perception of participants at the career choices workshops that qualified minority students who might be interested in health careers are instead choosing engineering, law, business, and computers (HRSA, 1986). The data on whether underrepresented minority Students are choosing these alternative careers is inconclusive because no information is available on whether substantial percentages of underrepresented minority students who would have entered health professions schools are now entering business schools or becoming computer professionals. However, the percentage increases in Blacks, Hispanics, and American Indians matriculating in graduate engineering programs are appreciably higher than for medical and dental schools (Table 19).

In the absence of studies which explore factors related to the demand for health professions training by minority individuals as well as the influence of available educational financing mechanisms, it is difficult to draw conclusions about the possible influence of economic factors on their career choices.

1/ To some extent the decreases in the proportion of applicants from families from the lowest income categories reflect the general shift of the population into higher income categories over time. However, as mentioned earlier in this report, the shift to higher income categories has been much greater among the families of medical school applicants than among U.S. families in general.

Table 18 - Percent Distribution of Underrepresented Minority Applicants and Acceptees to U.S. Medical Schools by Parental Income 1978 and 1984

Income	1978-1979 Applicants	1978-1979 Acceptees	1984-1985 Applicants	1984-1985 Acceptees	Change 1978-79 to 1984-85 Applicants	Change 1978-79 to 1984-85 Acceptees
Less Than $14,999	50.5	45.4	27.4	23.4	-45.7	-48.5
$15,000 to $29,999	25.8	28.8	28.6	28.0	10.8	-2.8
More Than $30,000	10.5	13.2	25.9	30.5	146.7	131.8
No Response	13.1	12.7	18.1	18.1		

SOURCE: Association of American Medical Colleges, Office of Minority Affairs, Facts and Figures I and II, November 1983 and April 1986

Table 19 - Change in Minority Enrollment in Medical, Dental, Law, and Engineering Schools, 1978-79 to 1984-85

Type of School and Race/Ethnicity of Student	1978-79		1984-85		Change in Number of Minority Students 1978-79 to 1984-85	
	No.	Percent	No.	Percent	No.	Percent Change
Medical						
Black	3,537	5.7	3,663	5.4	126	3.6
Hispanic	2,265	3.7	3,289	4.9	1,024	45.2
American Indian	202	0.3	254	0.4	52	25.7
Underrepresented Minority	6,004	9.7	7,206	10.7	1,202	20.0
Dental						
Black	977	4.4	1,037	5.0	60	6.1
Hispanic	414	1.9	719	3.5	305	73.7
American Indian	64	0.3	60	0.3	-4	-6.3
Underrepresented Minority	1,455	6.6	1,816	8.8	361	24.8
Law						
Black	5,350	4.4	5,955	4.7	605	11.3
Hispanic	2,788	2.3	3,487	2.8	699	25.1
American Indian	390	0.3	429	0.3	39	10.0
Underrepresented Minority	8,528	7.0	9,871	7.8	1,343	15.7
Engineering[1/]						
Black	843	1.3	1,476	1.6	633	75.1
Hispanic	738	1.2	1,241	1.4	503	68.2
American Indian	65	0.1	113	0.1	48	73.8
Underrepresented Minority	1,646	2.6	2,830	3.1	1,184	71.9

1/ Data Available Only to 1983-84

SOURCES: Association of American Medical colleges, Minority Students in Medical Education: Facts and Figures II, 1985, and unpublished data

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